MCS-207

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA–NEW)

Term-End Examination

June, 2023

MCS-207 : DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours　　　　　　*Maximum Marks : 100*

Weightage : 70%

Note : *Question No.* **1** *is compulsory and carries 40 marks. Attempt any* **three** *questions from Question No.* **2** *to Question No.* **5**.

1. (a) A library maintains the following information :

    (I)　A unique code of each member.

    (II)　Name of every member.

    (III) The book code of each book.

    (IV) The title of each book.

(V)   The books issued to a member (a member can get 5 books issued)

(VI)   Date of issue of book.

(VII) Date of return of book.

Perform the following tasks for the description given above :

(i)   List all the entities.   2

(ii)   List the attributes of each entity listed at (I).   2

(iii) List the relationships between/among the entities listed at (I).   2

(iv)   Draw an E-R diagram for the description given.   2

(v)   List all the constraints, including primary key and foreign keys.   2

(vi)   Convert the E-R diagram to relations.

2

(b)   Consider the following relations :   8

Hospital (Hospital_ID, Hospital_name, CEO_Name, Phone)

Doctor (Doctor_ID, Name, Specialisation, Hospital_ID)

The Hospital_ID and Doctor_ID are the primary key of relation Hospital and Doctor respectively. A Doctor can work in only one hospital.

Write the SQL commands for the following queries on the relations given above :

(i)   List all names of all the hospitals in the alphabetical order of hospital name.

(ii) Find the number of doctors working in the hospital, whose Hospital_ID = "HO1".

(iii) List the Hospital_ID, Hospital-name, Doctor_ID, Name, specialization of all the hospitals.

(iv) Find the name of all the doctors whose specialization is "Physician".

(c) Define the term transaction in the context of an RDBMS. Explain the properties of transactions with the help of examples.   10

(d) Explain the basic features of the following :

10

(i)   Complex data type in context to DBMS

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(ii) Data warehouse

(iii) Classification in the context of data mining

(iv) Clustering in the context of data mining

2. (a) Explain the following in the context of DBMS with the help of an example : 10

   (i) The conceptual level in three level database architecture

   (ii) Database Administrator

   (iii) File Manager

   (iv) Data dictionary

   (v) Hierarchical model

   (b) Explain the following operations in the relational model, with the help of an example for each : 10

   (i) PROJECTION

   (ii) SELECTION

   (iii) CARTESIAN PRODUCT

   (iv) UNION

   (v) SET DIFFERENCE

3. (a) Consider the following schema :

(Customer_ID,   Customer_name,
Account_No, Balance, type of account)

The scheme has the following constraints :

*   Customer_ID is unique for every customer.

*   Account_No is unique for every account.

*   A customer can open many accounts.

*   An account can belong to only one customer.

Perform the following tasks for the schema above :

(i)   List all the FDs in the schema.   4

(ii) What is the primary key of the schema ?   2

(iii) What are the different anomalies in the relation ? Show with the help of example data.   6

(iv) Normalize the relation to 2NF and then to 3NF.   5

(b) What is meant by lossless join decomposition ? Explain with the help of an example. 3

4. (a) Explain the following in the context of RDBMS, with the help of an example : 15

   (i) Serialisable schedule

   (ii) Two-phase locking

   (iii) Backward recovery

   (iv) Checkpoint

   (v) Authorisation

   (b) What is a measure of query cost ? How can you compute the cost of the SELECTION operation on a relational table, where data is not sorted in the order of attribute on which selection is being performed ? Explain. 5

5. Compare and contrast the features of the following with the help of an example : 20

   (a) Object oriented database management system and relational database management systems

(b) Classification and clustering in the context of data mining

(c) Dimensional table and fact table

(d) Operational data and data of a data warehouse

(e) No SQL database and relational database management system